REMARKS

Claims 1-23, 31 and 32 are all the claims pending in the application. Claims 24-30 have been canceled without prejudice or disclaimer and claims 31 and 32 have been newly added herewith.

Dealing with preliminary matters first, Applicants thank the Examiner for acknowledging receipt of Applicants' claim to priority and receipt of the priority document. In addition, Applicants further thank the Examiner for considering the references cited in the Information Disclosure Statement filed on February 23, 2006.

Election/Restriction

Applicants confirm the provisional election of Group I, claims 1-23. Applicants reserve the right to file a Divisional Application on non-elected claims 24-30.

Oath/Declaration

Applicants are submitting herewith a new declaration which identifies the citizenships of the inventors.

Drawing Objections

The Examiner has objected to the drawings because the flexible support 21 is depicted as a layer in Fig. 3 and a box in Fig. 2. However, Fig. 2 and Fig. 3 are different views and the different depiction of the flexible support 21 is a result of the different view. Particularly, whereas Fig. 3 is a cross-section of a cell, Fig. 2 is a schematic plan view of a stack 20B. Accordingly, Applicants submit that the different depictions of the flexible support in Figs. 2 and 3 is proper and consistent.

Claim Objections

The Examiner objects to claims 1, 13 and 14. It is believed that the Examiner meant to object to claims 1, 12 and 13. Applicant has amended claims 1, 12 and 13 in a manner believed to overcome the objection.

Claim Rejections - 35 U.S.C. § 112

Claims 1, 3, 4, 8-10, 15, 16, 20 and 21, are rejected under 35 U.S.C. § 112 (second paragraph) as being indefinite for failing to particularly point out and distinctly claim the invention. With respect to the rejection of claim 15 it appears as though the Examiner actually meant to reference claim 16. Applicants have amended the claims in a manner believed to overcome the rejection.

Claim Rejections - 35 U.S.C. § 103

Claims 1-9, 11, 12, 14, 22 and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan (U.S. Patent Publication No. 2002/0182475) in view of Maynard (U.S. Patent No. 6,541,149). Claims 10 and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan and Maynard as applied to claim 1 above and incorporated herein Narayanan (U.S. Patent No. 6,432,284). Still further, claim 13 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan and Maynard as applied to claim 1 above and incorporated herein Hinokuma (U.S. Patent Publication No. 2003/0013003). Finally, claims 15-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pan and Maynard as applied to claim 1 above and incorporated herein Shiue (U.S. Patent No. 6,500,575). For the following reasons, Applicants respectfully traverse the Examiner's objections and rejections.

The Examiner rejected claims 1-9, 11, 12, 14, 22 and 23 based on Pan in view of Maynard.

Pan discloses a fuel cell system that comprises two flex circuits, assembled face-to-face with PEM (proton exchange membrane) layers in between. Each flex circuit includes layers of a flex substrate, a patterned conductive material, a porous material sheet with a catalyst coating, and a PEM (*See*, paragraph 0005). The two flex substrates are assembled face-to-face with the PEM constrained therebetween (*See,* paragraph 0006). The assembled flex circuits are bent such that a closed structure is formed, for confining the fuel. The delivery of the fuel is achieved by capillary force of a porous material sheet, without requiting micro-channels and plumbing (*See* paragraph 0007).

As depicted in Fig. 2 of Pan, the fuel cell 100 is made by assembling face-to-face the two flex substrates 101 and 102, together with a PEM 103 in between. On either side of the PEM 103 are porous material and catalyst layers 104. Adjacent to the PEM 103 is also a palladium (Pd) layer 105 that prevents cross-over of the methanol.

Figures 5A to 5E (*See,* paragraphs 0038 to 0042) illustrates the sequence to form each flex circuit. In these figures, 150 is the substrate, 151 is a film electrode, 152 is a porous metal layer, 153 is a catalytic layer, 155 is a thin layer of PEM (note that reference 159 in Figure 5E is incorrect and appears that it should read as 155).

As mentioned above, the two flex circuits of Figure 5E, obtained separately, are then assembled face-to-face, such that the final structure shown at Figures 3A-3B is formed. This

structure can be shaped in the form of a cylinder, as shown in Figure 4, whose interior 131 and exterior 132 make the fuel side and the oxygen side (*See,* paragraph 0033).

As shown in Figure 5D, backside openings 154 on the flex substrate 150 and the thin film electrode 151 are formed on each flex substrate 150, so that the fuel or oxygen can reach the active catalytic layer 153 of the cells, through said openings and the porous metal layer 152 (*See,* paragraph 41) in the cylinder structure of Figure 4. Consequently, no ducts are required on the flex substrates for supplying the fuel or evacuating water from the cells and, as mentioned above, the fuel can be drawn to the cells by capillary action: in fact, an object of Pan is to avoid piping and pumps (*See,* paragraph 0007, 0037).

Summarizing, the structure of Pan includes two flexible substrates. Onto each substrate there are only some layers of a cell, to form a flexible circuit. The two flexible circuits are assembled face-to-face to form a plurality of cells in a flexible structure. This structure is then given a cylinder shape, wherein the fuel flows by capillarity. Fuel and oxygen can reach the cells through openings formed in the substrates of the two flexible circuits. No specific conduits are formed on the flex substrates and pumps are not required for the fuel.

In contrast to Pan, claim 1 recites that the entire structure of each cell is associated with one and the same flexible substrate (*See e.g.*, the non-limiting embodiment of Figures 2 and 3 and at page 5, lines 27-31; page 8, lines 4-9; and page 10, lines 3-6 and 16-20 of the specification). Additionally, Pan lacks at least one duct which supplies the cells with fuel, as set forth in the claimed invention. (*See e.g.*, the non-limiting embodiment of Fig. 2 and on page 6, 18-22 and page 8, lines 17-20 of the specification). Indeed, Pan specifically seeks to avoid

piping and pumps, and therefore does not include, and would not be modified to include ducts as claimed.

The Examiner cites Maynard only in relation to the use of the adjective "miniaturized" in pending claim 1, and Maynard does not correct the deficiencies of Pan with respect to claim 1. In fact Maynard teaches a way of forming the cells which is similar to Pan, i.e., by obtaining separately two distinct "half cells" (*See,* Figures 2A to 2C), one of which also includes a PEM membrane; the two parts are then assembled face-to-face (*See,* Figure 2D). Thus, Pan and Maynard both teach that the cells are to be formed by two parts, each including a respective substrate, which are assembled together face-to-face. Thus the combined teachings and suggestions of Pan and Maynard teach away from the solution of the instant invention, wherein the entire structure of the cell is formed using a single substrate.

In view of the above, the combined teachings and suggestions of Pan and Maynard are deficient with respect to claim 1. Also, the remaining references cited by the Examiner fail to correct the deficiencies of the combination of Pan and Maynard with respect to claim 1. Accordingly, Applicants submit that claim 1, and claims 3-10 and 12-23 which depend from claim 1, are allowable. Furthermore, some of the dependent claims are allowable at least for some additional reasons. For example, claims 15 and 16 recite a micro-pump. As discussed above, Pan specifically seeks to avoid pumps. Therefore, even if Shiue did disclose a micro-pump (which Applicants do not concede), Pan would not have been modified to include a micro-pump because such a modification would be directly against the specific teaching of the Pan reference.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

Stephen R. Valancius
Registration No. 57,574

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: September 11, 2006